

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Nobuhiko OOHARA et al.      Art Unit: 1626  
U.S. Patent No. 7,411,096                      Examiner: Nolan, J.  
Date of Patent: August 12, 2008              Application No.: 10/564,985  
Filed            : January 18, 2006  
Title            : PROCESS FOR PRODUCING OPTICALLY ACTIVE PHOSPHORUS  
                     HETEROCYCLIC DIMER

**ATTENTION: CERTIFICATE OF CORRECTIONS BRANCH**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

REQUEST FOR CERTIFICATE OF CORRECTION

Sir:

In reviewing the above-identified patent, a printing error was discovered therein requiring correction in order to conform to the Official Record in the application.

The error noted is set forth on the attached copy of Form PTO/SB/44 (09-07) in the manner required by the Commissioner's Notice.

Upon reviewing the patent it was noted that in the Abstract, line 7 of the first page of the patent, "Y-C<sub>n</sub>H<sub>2n</sub>-Y" should be deleted and the following formula added in its place  
--Y-C<sub>n</sub>H<sub>2n</sub>-Y--.

It is submitted that no fee is necessary for this request, as this error was incurred by the U.S. Patent and Trademark Office (USPTO). Please see the enclosed copy of the Abstract

REQUEST FOR CERTIFICATE OF CORRECTION  
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filed with the application. If the USPTO determines that it is necessary to charge the Certificate of Correction fee, the USPTO staff person in charge of this issue should contact the undersigned to discuss obtaining authorization to charge this fee to our Deposit Account.

Accordingly, applicants respectfully request the USPTO to issue the Certificate of Correction for this patent.

If there are any questions regarding this application, please telephone the undersigned at the telephone number listed below.

Respectfully submitted,

Date: September 3, 2008

  
Randolph A. Smith  
Reg. No. 32,548

**SMITH PATENT OFFICE**  
1901 Pennsylvania Ave., N.W.  
Suite 901  
Washington, DC 20006  
Telephone: 202/530-5900  
Facsimile: 202/530-5902  
Oohara090308

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CERTIFICATE OF CORRECTION**Page 1 of 1

PATENT NO. : 7,411,096

APPLICATION NO.: 10/564,984

ISSUE DATE : August 12, 2008

INVENTOR(S) : Nobuhiko OOHARA et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On title page, Item (57), ABSTRACT

in line 7, "Y-C<sub>n</sub>H<sub>2n</sub>-Y" should read -- Y-C<sub>n</sub>H<sub>2n</sub>-Y --

**MAILING ADDRESS OF SENDER (Please do not use customer number below):**

Smith Patent Office  
1901 Pennsylvania Ave., N.W., Suite 901  
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This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Page 1 of 1

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# ABSTRACT

Primary phosphine represented by formula (1):

[Chem. 1]



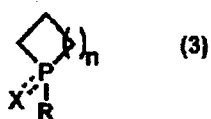
(wherein R represents a linear, branched, or cyclic alkyl group having 2 to 20 carbon atoms) is reacted with a compound represented by formula (2):

[Chem. 2]



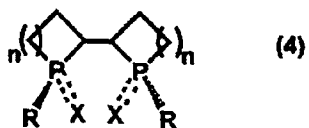
(wherein Y represents a halogen atom or a leaving group selected from -OTs, -OTf, and -OMs, and n represents a number of 3 to 6) in the presence of a base; the product is reacted with boron trihydride, oxygen, or sulfur to obtain a phosphorus heterocyclic compound represented by formula (3):

[Chem. 3]



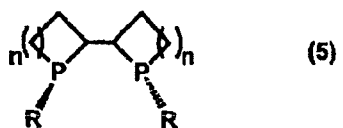
(wherein R represents the same as the above, n represents a number of 1 to 4, X represents a boron trihydride group, an oxygen atom, or a sulfur atom, and == represents a single bond when X is a boron trihydride group or a double bond when X is an oxygen atom or sulfur atom); the resultant compound is dimerized to produce a phosphorus heterocyclic dimer represented by formula (4):

[Chem. 4]



(wherein R, n, and X represent the same as the above); and then oxygen, sulfur, or borane is removed from the resultant phosphorus heterocyclic dimer to obtain an optically active phosphorus heterocyclic dimer represented by formula (5):

[Chem. 5]



(wherein R and n represent the same as the above).